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TO: Environmental Public Health Specialist Vs
Local Public Health Agencies and other Agencies with Interest in On-Site Sewage

FROM: Scott A. Clardy, Administrator
Section for Environmental Public Health

SUBJECT: Single-Family Lagoon Closure Guidance

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There have been several inquiries about requirements for the closure of single-family lagoons. Under RSMo 701.025 – 701.059 and 19 CSR 20-3.060, the Missouri Department of Health and Senior Services (DHSS) regulates single-family residence lagoons. Since the on-site sewage law and rules are silent on lagoon closure procedures, DHSS does not have any authority in this regard. However, the closure of a single-family lagoon is not exempt from the federal sludge regulations. Based on discussions with the Environmental Protection Agency (EPA) and Missouri Department of Natural Resources (DNR), the following are **recommendations only** to help homeowners comply with federal sludge regulations under Title 40 Code of Federal Regulations Part 503 (40 CFR 503).

Prior to disposing of sludge from a lagoon, the liquid must be properly disposed. Wastewater must not be discharged by breaking through the berm of the lagoon. This may be a violation of the Missouri On-site Sewage Law and/or the Missouri Clean Water Law. Proper methods of disposal could vary depending on the location of the lagoon, weather conditions, and the time frame for closure. A municipal treatment facility might accept the effluent, especially if individual residential lagoons are being replaced by a municipal facility. The DNR approved facility plans might include a lagoon closure plan, which should be followed. Wastewater in the lagoon could be allowed to evaporate, if time and weather conditions are favorable. Land application of the wastewater can be an acceptable method of disposal. The lagoon owner should consult a septage pumper/hauler who can dispose the waste under a land application permit from DNR. Sufficient area must be available to maintain the wastewater on the property where it is applied following best management practices for land application. Water quality guide numbers WQ 422 though WQ 426, published by University of Missouri, University Extension, are helpful in understanding best management practices for land application and sludge handling requirements. These guides may be ordered from the DNR Outreach and Assistance Office or viewed online at http://www.dnr.state.mo.us/oac/pubs.htm.

After the liquid is properly disposed, the remaining material should be treated and the lagoon closed. Residuals, or sludge, in a residential wastewater lagoon is considered septage. DNR's standard permit conditions include closure requirements, for lagoons with a design capacity equal to or less than 150 persons, that allow up to 100 dry tons of sludge per acre to be left in place. Therefore, to determine if the sludge may be left in place, an estimate is needed of the amount of sludge that has been produced. Sludge production of 0.015 dry tons per person per year is typical in a lagoon, and should be used for calculation purposes. If the age of the lagoon and average number of persons served is known or can be estimated, then the sludge production can be calculated. For example, the calculated sludge production in a 20-year old lagoon serving 4 persons would be:

0.015 dry tons per person per year x 4 persons x 20 years = 1.2 dry tons of sludge.

Then to determine the amount of sludge per acre, divide the calculated sludge production by the lagoon area in acres. Continuing the example, if the sludge would cover an area of 25 feet x 25 feet, the area and sludge per acre would be:

25 feet x 25 feet = 625 square feet
625 square feet / 43,560 sq. ft. per acre = 0.014 acres
1.2 dry tons / 0.014 acres = 86 dry tons per acre

In this example, since the amount of sludge is less than 100 dry tons per acre, it may be left in the lagoon basin. However if a lagoon had been in service for a long time or if it is undersized for the population served, an area larger than the lagoon may be needed to dispose of the sludge. Remember, this is only an example. The calculations should be run for each lagoon to determine whether the sludge can be left in place. It could be necessary to contract with a septage hauler to dispose of a portion of the sludge under a DNR land application permit or at a DNR permitted treatment facility.

Sludge left in the lagoon should be treated for pathogen reduction by mixing with hydrated lime at a rate of 50 lbs. of lime to 1,000 gallons (134 cubic feet) of sludge. Mix the treated residual sludge with soil on at least a 1 to 1 ratio, demolish the berm, and grade the site to prevent erosion or ponding of storm water. The site should then be vegetated.

By following the recommendations above, a property owner should be able to comply with the state and federal requirements for sludge treatment and disposal.